REMARKS

The Examiner has rejected Claims 1-29 under 35 U.S.C. 102(b) as being anticipated by Chauvin et al., U.S. Patent 6,008,820. Applicant respectfully disagrees with this rejection, especially in view of the amendments made hereinabove.

Specifically, applicant has amended each of the independent claims to include the subject matter of Claim 10, as well as additional limitations deemed to adequately distinguish the prior art reference to Chauvin.

In the Examiner latest action, the Examiner relies on the following excerpt from Chauvin to meet applicant's claimed "wherein the colored-transparency information is collected utilizing depth peeling" (see all independent claims).

> "In addition to texture mapping operations, this approach can also be applied to shadowing and multi-pass blending operations as well. For instance, texture reference data queue can be used to retrieve a shadow depth map residing in memory. Alternatively, the texture reference data queue can be used to retrieve color and/or alpha data used in multi-pass lighting and shading operations. More detail regarding texture mapping, shadowing, and multi-pass operations is provided below." (col. 22, lines 2-12)

Such excerpt, however, makes no disclosure, teaching or even suggestion of "depth peeling," let alone "collecting colored-transparency information from a plurality of depth layers in a scene to be rendered utilizing depth peeling" (emphasis added).

To further distinguish such depth peeling limitation from Chauvin and in the interest of expediting the prosecution of the present application, applicant now further claims that such depth peeling includes "peeling each portion of a scene in relation to a constraining depth layer" (see each of the independent claims). Thus, applicant now claims that each portion of the scene relating to the constraining depth layer is peeled, such that the colored-transparency information is collected for an entire window (i.e. "each portion"). This technique provides correct sorting down to pixel granularity (the smallest granularity for the most correct transparency).

In sharp contrast, Chauvin's image layers, or gsprites, are not peeled for the entire window (i.e. "each portion"), but rather include variable sized images for individual objects that the hardware attempts to reuse from frame to frame. Moreover, applicant's claimed distinguishing feature would not have been obvious in view of Chauvin. Specifically, Chauvin goes to extreme lengths in attempting to minimize the memory and memory bandwidth required for the system. See excerpt below:

> "Since all the geometry in one chunk is rendered before proceeding to the next, the depth buffer need only be as large as a single chunk. By using a relatively small chunk size such as 32x32 pixels, the depth buffer can be implemented directly on the graphics rendering chip. This eliminates a considerable amount of memory, and also allows the depth buffer to be implemented using a specialized memory architecture which can be accessed with very high bandwidth and cleared during double buffer operations, eliminating the traditional frame buffer memory clearing overhead between frames." (col. 9, line 63 - col. 10, line 6)

Thus, Chauvin *teaches away* from applicant's claimed invention which, by virtue of "peeling each portion of a scene," utilizes more memory (rather than minimization thereof), with the benefit of correct sorting down to pixel granularity, for example.

The Examiner is reminded that a claim is anticipated only if each and every element as set forth in the claim is found, either expressly or inherently described in a single prior art reference. *Verdegaal Bros. v. Union Oil Co. Of California*, 814 F.2d 628, 631, 2 USPQ2d 1051, 1053 (Fed. Cir. 1987). Moreover, the identical invention must be shown in as complete detail as contained in the claim. *Richardson v. Suzuki Motor Co.*868 F.2d 1226, 1236, 9USPQ2d 1913, 1920 (Fed. Cir. 1989). The elements must be arranged as required by the claim.

This criteria has simply not been met by the Chauvin reference, especially in view of the amendments made hereinabove. Moreover, it would not have been obvious to modify Chauvin, for the reasons set forth above.

Applicant further notes that the Examiner's application of Chauvin to applicant's dependent claims is further replete with deficiencies. Just by way of example, the Examiner relies on the following excerpts to make a prior art showing of applicant's claimed:

> "wherein the depth peeling includes executing a first rendering pass for collecting colored-transparency information relating to a first depth layer, and executing additional rendering passes for collecting additional colored-transparency information relating to additional depth layers" (see Claim 11);
>
> "wherein the first rendering pass produces a shadow map relating to the first depth layer" (see Claim 12); and
>
> "wherein a shadow-mapping feature is enabled during the additional rendering passes for defining a previous depth layer" (see Claim 13).

"The setup engine 388 also communicates with the texture read queue 390, and a texture address generator 392. The texture read queue 390 buffers read requests for texture blocks from shared memory. While we use the term "texture" in referring to the portions of the tiler used to retrieve image data blocks from memory, it should be understood that this term can refer to texture maps, shadow maps, and other image data used in multi-pass rendering operations. The texture address generator 392 determines the address in memory of the requested chunks and sends texture read requests to the command and memory control 380. The texture address generator 392 includes a memory management unit that controls the writing of image data to the texture cache." (col. 18, lines 50-60)

"The scan convert engine 398 passes texture addresses to the texture filter engine 400, which calculates the texture data. The texture filter engine 400 calculates pixel color and alpha data for polygons that are being rendered. The illustrated texture filter engine computes a filter kernel based on the Z-slope and orientation of the triangle being rendered, and on the center of the texture request (the S and T coordinates of a point mapped into the texture)." (col. 19, lines 10-18)

After careful review of such excerpts as well as the rest of the Chauvin reference, it appears that the Examiner has merely found the occurrence of the term "shadow map," used in its conventional sense. Applicant further notes that, in the same way that Chauvin fails to suggest applicant's specifically claimed "depth peeling," Chauvin further fails to disclose, teach or even suggest any sort of use of shadow mapping in conjunction with depth peeling,

as claimed in Claims 11-13. It should further be noted that this deficiency in the Examiner's action is further applicable to the subject matter of Claims 14-22.

Still yet, with respect to Claim 15, the Examiner relies on Fig. 5A and the following excerpt from Chauvin to make a prior art showing of applicant's claimed: "wherein the colored-transparency information is collected utilizing the depth peeling including executing a first rendering pass for generating a shadow map from which first colored-transparency information relating to a first depth layer is collected, and executing additional rendering passes with a shadow-mapping feature enabled and from the same eye position from which the first rendering pass is taken for collecting additional colored-transparency information relating to additional depth layers."

> "In addition to texture mapping operations, this approach can also be applied to shadowing and multi-pass blending operations as well. For instance, texture reference data queue can be used to retrieve a shadow depth map residing in memory. Alternatively, the texture reference data queue can be used to retrieve color and/or alpha data used in multi-pass lighting and shading operations. More detail regarding texture mapping, shadowing, and multi-pass operations is provided below." (col. 22, lines 2-12)

Again, such excerpt is deficient for the reasons set forth above. Still yet, such excerpt and the remaining Chauvin references fails to make any disclosure, teaching or even suggestion of applicant's claimed "wherein the colored-transparency information is collected utilizing the depth peeling including executing a first rendering pass for generating a shadow map from which first colored-transparency information relating to a first depth layer is collected, and executing additional rendering passes with a shadow-mapping feature enabled and from the same eye position from which the first rendering pass is taken for collecting additional colored-transparency information relating to additional depth layers" (emphasis added). Only applicant teaches and claims a shadow map and shadow-mapping feature in such specific context, as claimed.

A notice of allowance or a specific prior art showing of such dependently claimed features, in combination with the remaining claim elements, is respectfully requested.

In the event a telephone conversation would expedite the prosecution of this application, the Examiner may reach the undersigned at (408) 505-5100. For payment of any fees due in connection with the filing of this paper, the Commissioner is authorized to charge such fees to Deposit Account No. 50-1351 (Order No. NVIDP053).

Respectfully submitted,
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